

Claims

1. Borehole treatment composition comprising an aqueous phase and a non-aqueous oil phase, emulsifiers and, where appropriate, further customary additives, such as weighting agents, fluid loss additives, viscosity regulators, wetting agents, salts, biocides, corrosion inhibitors and/or an alkali reserve, the non-aqueous phase being selected in whole or in part from the group consisting of
 - a) paraffins having from 5 to 22 carbon atoms and/or
 - b) internal olefins having from 12 to 30 carbon atoms in the molecule in each case in the form of a blend with
 - c) carboxylic esters of the general formula R-COO-R', where R stands for a linear or branched, saturated or unsaturated alkyl radical having from 15 to 25 carbon atoms and R' denotes a saturated, linear or branched alkyl radical having from 3 to 22 carbon atoms characterized in that the ratio of the toxicity of internal olefins of chain length C16/C18 (standard IO) to the toxicity of the constituents of the non-aqueous phase, in each case measured by the Leptocheirus plumulosus acute, static 96 hour/10 day sediment toxicity test (in accordance with ASTM E 1367 - 92 & EPA/600/R-94/025, Section 11), is less than 1.
2. Borehole treatment composition according to Claim 1, characterized in that they are in water-in-oil (W/O) emulsion form.

3. Borehole treatment composition according to Claims 1 and 2, characterized in that it is formulated as a drilling mud.
- 5 4. Borehole treatment composition according to Claims 1 to 3, characterized in that the weight ratio between the aqueous phase and the oil phase is from 50:50 to 1:99, preferably from 30:70 to 20:80 and in particular 10:90.
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5. Borehole treatment composition according to Claims 1 to 4, characterized in that at least 50% by weight, preferably at least 80% by weight and in particular at least 90% by weight of the oil phase is composed of compounds a) and/or b) and c).
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6. Borehole treatment composition according to one of Claims 1 to 5, characterized in that component a) is selected from the group consisting of linear and branched paraffins having from 10 to 21 carbon atoms, branched paraffins being particularly preferred.
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7. Borehole treatment composition according to one of Claims 1 to 6, characterized in that component b) is selected from the group consisting of internal olefins having from 12 to 30 carbon atoms, preferably from 14 to 24 and in particular up to 20 carbon atoms.
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8. Borehole treatment composition according to Claims 1 to 7, characterized in that component c) is selected from esters of the formula R-COO-R' in which R stands for saturated or unsaturated linear alkyl radicals having from 15 to 23 carbon atoms and R' denotes a linear or branched saturated alkyl radical having from 6 to 22 carbon atoms.
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9. Borehole treatment composition according to Claims 1 to 8, characterized in that in addition to the esters according to Claim 7 there is not more than 15% by weight (based on the oil phase) of esters with radicals R which stand for alkyl radicals having more than 23 carbon atoms.
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10. Borehole treatment composition according to Claims 1 to 9, characterized in that 100% by weight of the non-aqueous oil phase is composed of the compounds a) and/or b) and c).
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11. Borehole treatment composition according to Claims 1 to 10, characterized in that at least 50% by weight, preferably at least 80% by weight and in particular 100% by weight of the non-aqueous oil phase comprises blends of compounds b) and c).
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12. Borehole treatment composition according to Claims 1 to 11, characterized in that in addition to the compounds a) to c) there are further, environmentally compatible, water-insoluble component [sic] present.
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- 25 13. Borehole treatment composition according to Claims 1 to 12, characterized in that as a further component use is made of esters of C1-C5 monocarboxylic acids with mono- and/or polyfunctional alcohols, the alcohols having at least 6, preferably at least 8, and the polyhydric alcohols from 2 to 6, carbon atoms per molecule.
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- 35 14. Borehole treatment composition according to Claims 1 to 13, characterized in that further components present in the non-aqueous oil phase include mixtures of secondary esters selected from the group consisting of propyl carboxylate, butyl carboxylate, pentyl carboxylate, hexyl carboxylate, heptyl carboxylate, octyl

- carboxylate, nonyl carboxylate, decyl carboxylate,
undecyl carboxylate, dodecyl carboxylate, tridecyl
carboxylate, tetradecyl carboxylate, pentadecyl
carboxylate, hexadecyl carboxylate, heptadecyl
5 carboxylate, octadecyl carboxylate, nonadecyl
carboxylate, eicosyl carboxylate, uneicosyl
carboxylate, doeicosyl carboxylate and isomers
thereof, the secondary esters each having a
carboxylate radical of 1 to 5 carbon atoms.
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15. Borehole treatment composition according to Claims
1 to 14, characterized in that the non-aqueous oil
phase has a pour point of below 0°C, preferably
below -5°C.
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16. Borehole treatment composition according to Claims
1 to 15, [lacuna] as an oil-based drilling mud of
the W/O type has a plastic viscosity (PV) in the
range from 10 to 70 mPas and a yield point (YP)
20 from 5 to 60 lb/100 ft², measured in each case at
50°C, characterized in that the non-aqueous oil
phase has a Brookfield viscosity at 0°C of not more
than 50 mPas.
- 25 17. Borehole treatment composition according to Claims
1 to 16, characterized in that as an oil-based
drilling mud of the W/O type it has a plastic
viscosity (PV) in the range from 10 to 60 mPas and
a yield point (YP) from 5 to 40 lb/100 ft²,
30 measured in each case at 50°C.
18. Borehole treatment composition according to Claims
1 to 17, characterized in that the oil phase has
an Ubbelohde viscosity at 20°C of not more than
35 12 mm²/s.
19. Borehole treatment composition according to Claims
1 to 18, characterized in that the aqueous phase

has a pH in the range from 7.5 to 12, preferably from 7.5 to 11 and in particular from 8 to 10.

20. Borehole treatment composition according to Claims
5 1 to 19, characterized in that the non-aqueous oil
phase comprise blends of components a) or b) and
c) in a weight ratio of from 10:1 to 1:1,
preferably from 5:1 to 1:1 and in particular from
3:1 to 1:1.
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21. Borehole treatment composition according to Claims
1 to 20, characterized in that it comprises non-
aqueous components b) whose relative toxicity in
relation to standard IOs of chain length C16/C18
15 is greater than 1, it being necessary for
compounds according to c) to be present in the
non-aqueous oil phase.
22. Use of blends of a) linear or branched paraffins
20 having from 10 to 22 carbon atoms and/or b)
internal olefins having from 12 to 30 carbon atoms
per molecule with c) carboxylic ester [sic] of the
general formula R-COO-R' in which R stands for a
line or branched, saturated or unsaturated alkyl
25 radical having from 15 to 25 carbon atoms and R'
denotes a saturated, linear or branched alkyl
radical having from 3 to 22 carbon atoms for
producing invert drilling muds of low toxicity.
- 30 23. Use of esters of the formula R-COO-R' in which R
stands for a line or branched, saturated or
unsaturated alkyl radical having from 15 to 25
carbon atoms and R' denotes a saturated, linear or
branched alkyl radical having from 3 to 22 carbon
35 atoms as a mixture constituent in invert drilling
muds which comprise paraffins and/or internal
olefins as constituents of the oil phase for
reducing the toxicity of the oil phase of the
invert drilling muds, measured by the Leptocheirus

plumulosus acute, static 96 hour/10 day sediment toxicity test (in accordance with ASTM E 1367 - 92 & EPA/600/R-94/025, Section 11).

- 5 24. Drilling mud comprising an aqueous phase and a non-aqueous oil phase, emulsifiers and, where appropriate, further customary additives, such as weighting agents, fluid loss additives, viscosity regulators, wetting agents, salts, biocides, 10 corrosion inhibitors and/or an alkali reserve, more than 50% by weight of the non-aqueous phase being selected from the group consisting of esters of the general formula R-COO-R' in which R stands for a linear or branched, saturated or unsaturated 15 alkyl radical having from 15 to 25 carbon atoms and R' denotes a saturated, linear or branched alkyl radical having from 3 to 10 carbon atoms, the drilling mud having a relative toxicity, i.e. the ratio of the toxicity of internal olefins of 20 chain length C16/C18 (standard IO) to the toxicity of the constituents of the non-aqueous phase, in each case measured by the Leptocheirus plumulosus acute, static 96 hour/10 day sediment toxicity test (in accordance with ASTM E 1367 - 92 & 25 EPA/600/R-94/025, Section 11), of less than 1.
25. Use of esters of the general formula R-COO-R' in which R stands for a linear or branched, saturated or unsaturated alkyl radical having from 15 to 25 30 carbon atoms and R' denotes a saturated, linear or branched alkyl radical having from 3 to 10 carbon atoms as an additive to drilling muds comprising an aqueous phase and a non-aqueous oil phase, emulsifiers and, where appropriate, further 35 customary additives, such as weighting agents, fluid loss additives, viscosity regulators, wetting agents, salts, biocides, corrosion inhibitors and/or an alkali reserve, for improving the lubricating properties of the drilling muds.

26. Use of esters of the general formula R-COO-R' in
which R stands for a linear or branched, saturated
or unsaturated alkyl radical having from 15 to 25
5 carbon atoms and R' denotes a saturated, linear or
branched alkyl radical having from 3 to 10 carbon
atoms as an additive to drilling muds comprising
an aqueous phase and a non-aqueous oil phase,
emulsifiers and, where appropriate, further
10 customary additives, such as weighting agents,
fluid loss additives, viscosity regulators,
wetting agents, salts, biocides, corrosion
inhibitors and/or an alkali reserve, for reducing
the fraction of structuring agents based on clays
15 with or without chemical or physical modification.